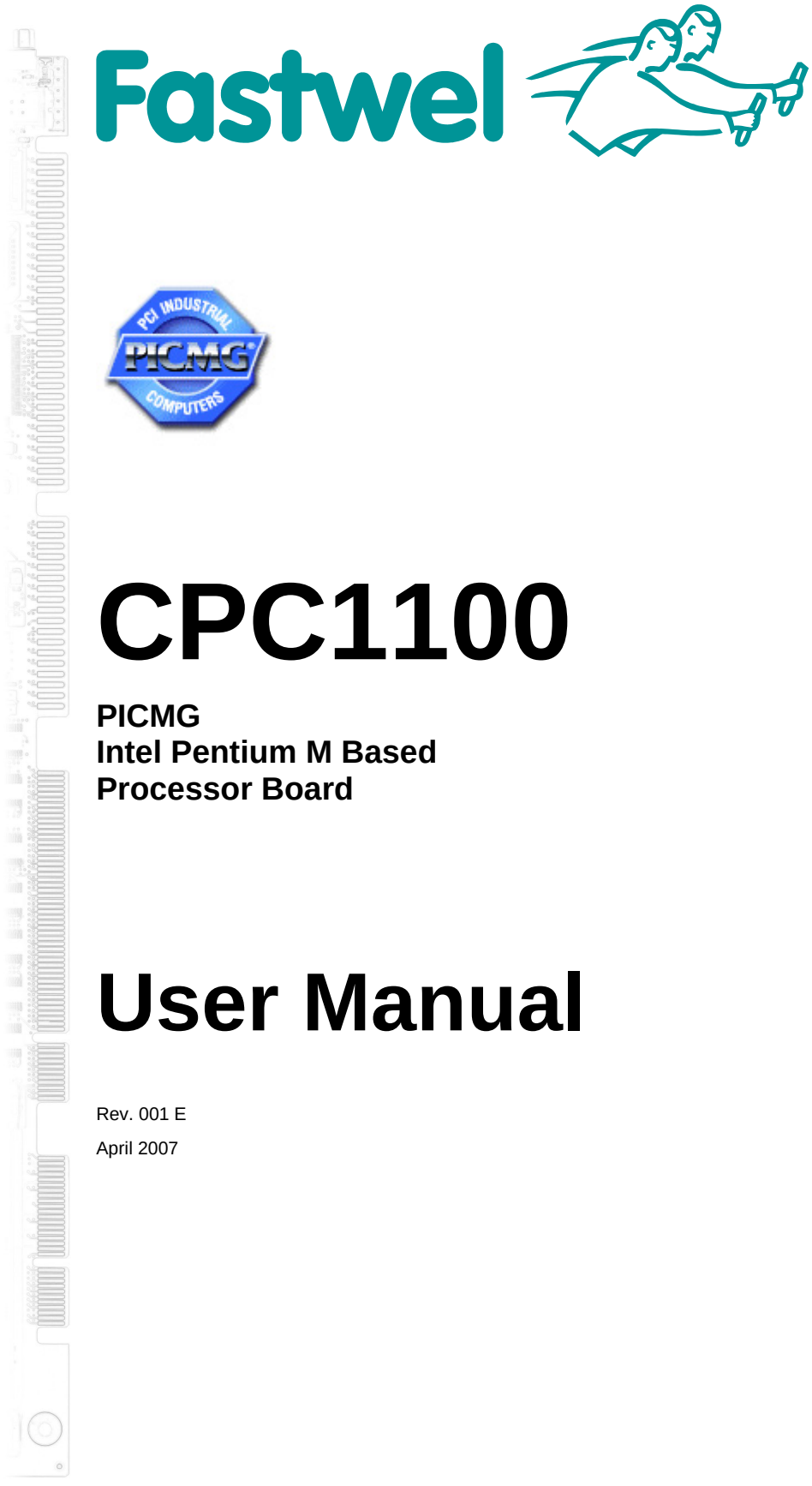

CPC1100

PICMG
Intel Pentium M Based
Processor Board

User Manual

Rev. 001 E

April 2007

The product described in this manual is compliant to all related CE standards.

Product Title: CPC1100
Document Name: CPC1100 User Manual
Manual Version: 001 E

Revision Record

Rev. Index	Brief Description	Product Index	Date
001	Initial version	CPC1100	April 2007

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Notation Conventions

Warning, ESD Sensitive Device!

This symbol draws your attention to the information related to electro static sensitivity of your product and its components. To keep product safety and operability it is necessary to handle it with care and follow the ESD safety directions.

Warning!

This sign marks warnings about hot surfaces. The surface of the heatsink and some components can get very hot during operation. Take due care when handling, avoid touching hot surfaces!

Caution: Electric Shock!

This symbol warns about danger of electrical shock (> 60 V) when touching products or parts of them. Failure to observe the indicated precautions and directions may expose your life to danger and may lead to damage to your product.

Warning!

Information marked by this symbol is essential for human and equipment safety.
Read this information attentively, be watchful.

Note...

This symbol and title marks important information to be read attentively for your own benefit.

General Safety Precautions

This product was developed for fault-free operation. Its design provides conformance to all related safety requirements. However, the life of this product can be seriously shortened by improper handling and incorrect operation. That is why it is necessary to follow general safety and operational instructions below.

Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.

Warning!

When handling this product, special care must be taken not to hit the heatsink (if installed) against another rigid object. Also, be careful not to drop the product, since this may cause damage to the heatsink, CPU or other sensitive components as well.

Please, keep in mind that any physical damage to this product is not covered under warranty.

Note:

This product is guaranteed to operate within the published temperature ranges and relevant conditions. However, prolonged operation near the maximum temperature is not recommended by Fastwel or by electronic chip manufacturers due to thermal stress related failure mechanisms. These mechanisms are common to all silicon devices; they can reduce the MTBF of the product by increasing the failure probability. Prolonged operation at the lower limits of the temperature ranges has no limitations.

Caution, Electric Shock!

Before installing this product into a system and before installing other devices on it, always ensure that your mains power is switched off.

Always disconnect external power supply cables during all handling and maintenance operations with this module to avoid serious danger of electrical shock.

Unpacking, Inspection and Handling

Please read the manual carefully before unpacking the module or mounting the device into your system. Keep in mind the following:

ESD Sensitive Device!

Electronic modules and their components are sensitive to static electricity. Even a non-perceptible by human being static discharge can be sufficient to destroy or degrade a component's operation! Therefore, all handling operations and inspections of this product must be performed with due care, in order to keep product integrity and operability:

- Preferably, unpack or pack this product only at EOS/ESD safe workplaces. Otherwise, it is important to be electrically discharged before touching the product. This can be done by touching a metal part of your system case with your hand or tool. It is particularly important to observe anti-static precautions when setting jumpers or replacing components.
- If the product contains batteries for RTC or memory back-up, ensure that the module is not placed on conductive surfaces, including anti-static mats or sponges. This can cause short-circuit and result in damage to the battery and other components.
- Store this product in its protective packaging while it is not used for operational purposes.

Unpacking

The product is carefully packed in an antistatic bag and in a carton box to protect it against possible damage and harmful influence during shipping. Unpack the product indoors only at a temperature not less than +15°C and relative humidity not more than 70%. Please note, that if the product was exposed to the temperatures below 0°C for a long time, it is necessary to keep it at normal conditions for at least 24 hours before unpacking. Do not keep the product close to a heat source.

Following ESD precautions, carefully take the product out of the shipping carton box. Proper handling of the product is critical to ensure correct operation and long-term reliability. When unpacking the product, and whenever handling it thereafter, be sure to hold the module preferably by the front panel, card edges or ejector handles. Avoid touching the components and connectors.

Retain all original packaging at least until the warranty period is over. You may need it for shipments or for storage of the product.

Initial Inspection

Although the product is carefully packaged, it is still possible that shipping damages may occur. Careful inspection of the shipping carton can reveal evidence of damage or rough handling. Should you notice that the package is damaged, please notify the shipping service and the manufacturer as soon as possible. Retain the damaged packing material for inspection.

After unpacking the product, you should inspect it for visible damage that could have occurred during shipping or unpacking. If damage is observed (usually in the form of bent component leads or loose socketed components), contact Fastwel's official distributor from which you have purchased the product for additional instructions. Depending on the severity of the damage, the product may even need to be returned to the factory for repair. DO NOT apply power to the product if it has visible damage. Doing so may cause further, possibly irreparable damage, as well as result in a fire or electric shock hazard.

If the product contains socketed components, they should be inspected to make sure they are seated fully in their sockets.

Handling

In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.

In order to keep Fastwel's warranty, you must not change or modify this product in any way, other than specifically approved by Fastwel or described in this manual.

Technical characteristics of the systems in which this product is installed, such as operating temperature ranges and power supply parameters, should conform to the requirements stated by this document.

Retain all the original packaging; you will need it to pack the product for shipping in warranty cases or for safe storage. Please, pack the product for transportation in the way it was packed by the supplier.

When handling the product, please, remember that the module, its components and connectors require delicate care. Always keep in mind the ESD sensitivity of the product.

Three Year Warranty

Fastwel Co. Ltd. (Fastwel), warrants that its standard hardware products will be free from defects in materials and workmanship under normal use and service for the currently established warranty period. Fastwel's only responsibility under this warranty is, at its option, to replace or repair any defective component part of such products free of charge.

Fastwel neither assumes nor authorizes any other liability in connection with the sale, installation or use of its products. Fastwel shall have no liability for direct or consequential damages of any kind arising out of sale, delay in delivery, installation, or use of its products.

If a product should fail through Fastwel's fault during the warranty period, it will be repaired free of charge. For out of warranty repairs, the customer will be invoiced for repair charges at current standard labor and materials rates.

Warranty period for Fastwel products is 36 months since the date of purchase.

The warranty set forth above does not extend to and shall not apply to:

1. Products, including software, which have been repaired or altered by other than Fastwel personnel, unless Buyer has properly altered or repaired the products in accordance with procedures previously approved in writing by Fastwel.
2. Products, which have been subject to power, supply reversal, misuse, neglect, accident, or improper installation.

Returning a product for repair

1. Apply to Fastwel company or to any of the Fastwel's official representatives for the Product Return Authorization.
2. Attach a failure inspection report with a product to be returned in the form, accepted by customer, with a description of the failure circumstances and symptoms.
3. Carefully package the product in the antistatic bag in which the product had been supplied. Failure to package in antistatic material will VOID all warranties. Then package the product in a safe container for shipping.
4. The customer pays for shipping the product to Fastwel or to an official Fastwel representative or dealer.

Chapter 1

Introduction

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1 Introduction

1.1 Overview

The product described in this Manual is CPC1100, a full length PICMG 1.0 format processor board for high-performance industrial computers. The board is based on Intel® Pentium® M processor in the μFCPGA478 or μFCBGA478 packages operating at frequencies of up to 2.0 GHz, and a Processor Side Bus (PSB) running at 400 or 533 MHz. The Intel Pentium M processor core with integrated 64 KB L1 and up to 2048 KB L2 cache provides its unique performance to power consumption ratio.

The CPC1100 chipset comprising 82915GM GMCH and ICH6 (ICH6M – option) provides a number of integrated modern communication and storage interfaces, thus eliminating the need for additional external controllers. The chipset also incorporates dual-channel DDR2 memory interface. The board can bear up to 2 GB of PC4200 memory installed in two DDR2 240-contact DIMM sockets.

The board has wide range of interfaces for peripheral devices: eight USB 2.0, two RS232/optoisolated RS485, LPT and PS/2 and standard video/audio interfaces. The chipset's built-in video controller incorporates a 2D/3D graphics accelerator with up to 64 MB memory shared with system for enhanced graphics performance with VGA CRT-display.

CPC1100 offers two Gigabit Ethernet ports (or optionally one Gigabit and one Fast Ethernet), which make this board highly suitable for network rich infrastructure.

CPC1100 supports storage devices with IDE UltraATA/100 and CompactFlash interfaces, up to four SerialATA channels and standard FDD.

In addition to PICMG 1.0 parallel 16-bit ISA and 32-bit PCI buses, CPC1100 board supports up to four serial PCI Express x1 channels or one x4 channel. Besides, one MiniPCI expansion module can be installed directly on the board.

Extra reliability of CPC1100 is provided by the hardware monitoring subsystem. This prevents accidental damage to the hardware under unfavourable thermal conditions.

CPC1100 is manufactured using high quality embedded industrial system components specially selected to ensure their long term availability.

CPC1100 board usage model includes:

- PICMG 1.0 CPU card in a PICMG passive backplane system, for example in standard 5U industrial servers;
- Full size PICMG CPU card with customized active backplane providing PCI Express to PCI bridge or other bridging hardware along with PCI and ISA buses;
- CPC1100 as a standalone card for slim industrial backplaneless servers.

The board is compatible with the Microsoft® Windows® 2000/XP/CE, QNX and Linux® operating systems.

Some of the CPC1100's outstanding features are:

- Intel® Pentium® M processor family, up to 2.0 GHz
- Up to 2 MB L2 on-die cache running at CPU speed
- 82915GM GMCH and ICH6 (ICH6M) chipset
- 400/533 MHz processor system bus
- Up to 2 GB dual channel of DDR2 SDRAM memory running at 533 MHz
- Integrated 3D high performance VGA controller
  - 64 MB memory shared with system
  - CRT-displays support with resolutions of up to 2048 x 1536 pixels at 16 bits and 75 Hz
- Two Gigabit Ethernet interfaces (one Gigabit and one Fast Ethernet optionally) via PCI-Express bus: 10Base-T, 100Base-TX, and 1000Base-T
- EIDE Ultra ATA/100 interface
- Up to four SATA ports
- Onboard CompactFlash Type I/II socket
- Two serial ports RS232/RS485 (optoisolated), software switchable (*)
- Up to eight USB 2.0 ports (*)
- PS/2 keyboard and mouse interface (*)
- Floppy disk interface (*)
- Parallel port (*)
- AC97 compatible audio codec with line input/output and microphone interfaces (*)
- Mini PCI interface
- PCI bus: 32-bit / 33 MHz
- ISA bus 16-bit
- Optional PCI Express: up to four x1 or one x4 (**)
- Hardware Monitor (LM87)
- Additional counters and timers integrated in the ICH
- Real-time clock with battery backup
- Phoenix® BIOS
- PICMG 1.0 specification compliant
- ATX power supply support with 20-pin connector
- Passive or active heatsink solution

(*) – Available via additional cable adapters
(**) – For customized board versions

1.2 CPC1100 Versions

At the present time, the board is offered in flexible configuration. The options include different processors, the size of supplied system memory, and other options described in this section.

The customer can choose necessary configuration options using the following template:

1	–	2	–	3	4

1 Basic product name:

CPC1100

2 Configuration version

01	Two Gigabit Ethernet channels
02	One Fast Ethernet and one Gigabit Ethernet channel

3 Processor:

P1.4	Pentium M 1.4 GHz, 400 MHz FSB
P1.8	Pentium M 1.8 GHz, 400 MHz FSB
P2.0	Pentium M 2.0 GHz, 533 MHz FSB

4 Other options:

DIMM memory module:

\DIMM512	512 MB DDR2 SDRAM DIMM
\DIMM1024	1024 MB DDR2 SDRAM DIMM

Cooling:

\COOLER	Heatsink with fan installed

CompactFlash Module

\CF128	128 MB CompactFlash card
\CF256	256 MB CompactFlash card
\CF512	512 MB CompactFlash card
\CF1024	1024 MB CompactFlash card

Operating System

\DOS	DOS
\XPE	Windows XP Embedded
\QNX	QNX
\WCE	Windows CE 5.0
\LNX	Linux 2.4.20

Example:

CPC1100 – 02 – P1.8 \DIMM512 \COOLER \CF128 \XPE

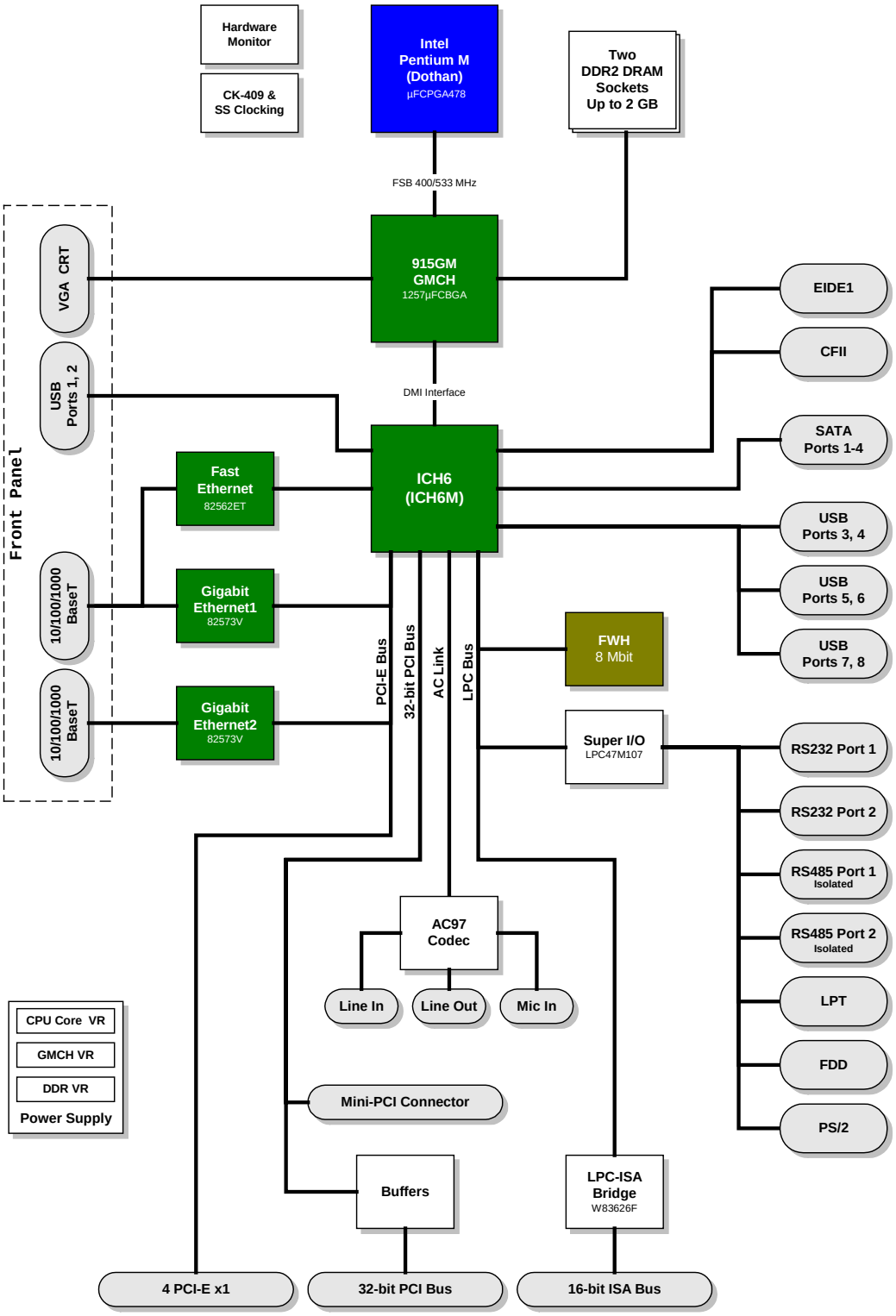
PICMG, Pentium® M, Intel® 915GM, DDR2, SVGA, PCI_E, SATA, 1 Fast Ethernet, 1 Gigabit Ethernet
Pentium M 1.8 GHz, 400 MHz FSB
512 MB DDR2 SDRAM DIMM
Heatsink & fan installed
128 MB CompactFlash card
Windows XP Embedded

1.3 CPC1100 Diagrams

The diagrams in this section give visual information about the CPC1100 board design, its appearance, connectors and components layout. The diagrams may not reflect insignificant differences between the CPC1100 versions and generations.

1.3.1 Block Diagram

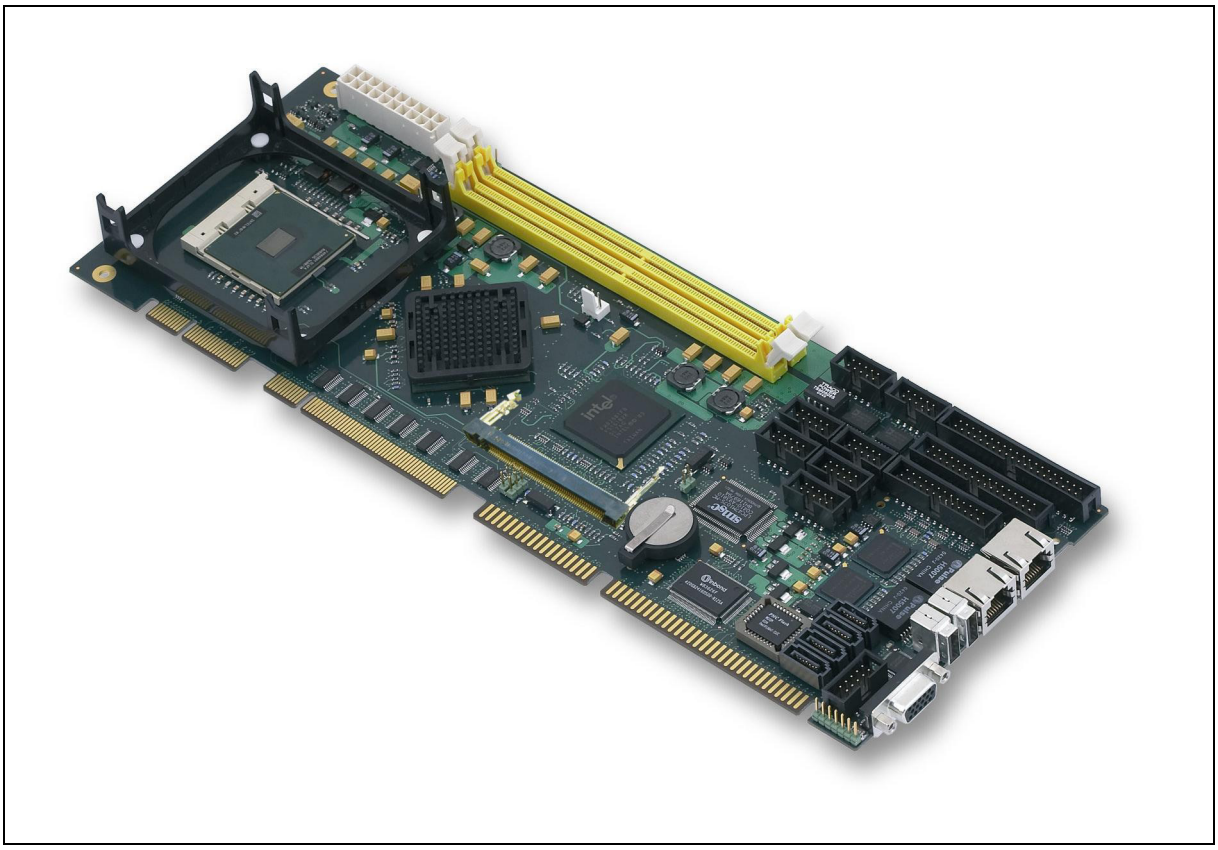
Figure 1-1: CPC1100 Block Diagram



The block diagram may not reflect recent design changes.
The LPC-ISA bridge can be replaced by a PCI-ISA one.

1.3.2 Board Appearance

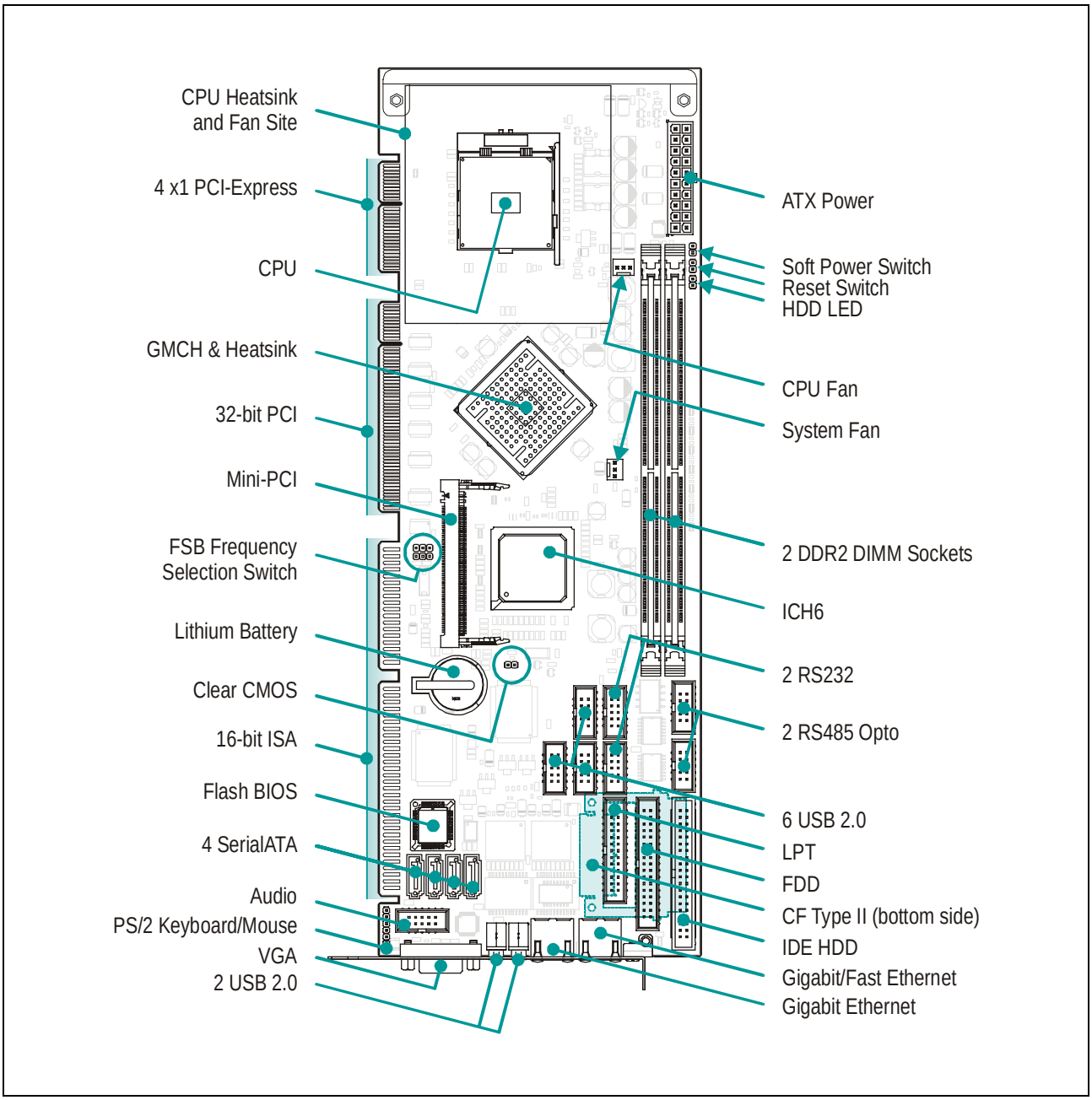
Figure 1-2: CPC1100 Board Appearance



The appearance may vary for different versions of the board.
The front retaining bracket, rear mounting bracket, CPU heatsink and fan are not shown.

1.3.3 Board Layout

Figure 1-3: CPC1100 Board Layout



The layout may slightly differ for various versions of the board.

1.4 Technical Characteristics

1.4.1 Processor, Memory and Chipset

CPU

The CPC1100 supports the following Intel processor family:

Pentium® M Processor 90 nm (Dothan)

- Up to 2.0 GHz
- Up to 2 MB L2 on-die cache
- 400/533 MHz PSB
- Supports SpeedStep® III for low power mode

Memory

Main memory:

- Up to 2 GB of DDR2 SDRAM memory in two 240 pin DIMM sockets
- Memory frequency: 533 MHz (PC4200)

Flash memory:

- 1 MB flash memory Firmware Hub (a part of the chipset) for BIOS storage
- CompactFlash card in CF Type I/II socket

Chipset

Intel® 82915GM Graphics and Memory Controller Hub (GMCH)

- Intel® Pentium® M processor with 2 MB L2 cache support (533 MHz PSB)
- Intel® Pentium® M processor LV and ULV support (400 MHz PSB)
  - 32-bit host bus addressing
  - 12-deep in-order queue
  - Enhanced Intel SpeedStep® technology
- Intel® Celeron® M and Celeron® M ULV 90 nm processor support (400 MHz PSB)
  - 32-bit host bus addressing support
  - 12-deep in-order queue support
- 64-bit AGTL/AGTL+ based PSB interface at 400/533 MHz
- 64-bit System Memory interface, optimized for DDR or DDR2 SDRAM memory operating at 400 or 533 MHz
- DDR2 dual channel memory symmetric and asymmetric modes
- Integrated 2D/3D Graphics and H/W Motion Compensation Engines
- Integrated DAC, 400 MHz
- Intel® Graphics Media Accelerator 900
- Intel® Stable Image Technology

Intel® I/O Controller Hub 6 (ICH6) (82801FB) or ICH6M (82801FBM, option)

- PCI-Express bus with four PCI Express root ports
- PCI Bus rev. 2.3 interface at 33 MHz
- Integrated Serial ATA host controller
- Integrated IDE controller Ultra ATA100, BMIDE and PIO modes
- Intel® High Definition or AC97 Audio Interface
- USB 2.0 host interface

- Integrated Fast Ethernet LAN controller
- ACPI 2.0 compliant power management logic
- Enhanced DMA controller
- High precision event timers
- Interrupt controller
- System Management Bus
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support via LPC bus

1.4.2 Interfaces

PCI-Express Interface

Fully compliant with PCI Express 1.0a specification

- Four PCI Express root ports shared with Gigabit Ethernet ports
- Statically configured as four x1 lanes or one x4 lane
- Up to 2.5 Gb/s bandwidth in each direction per x1 lane
- Two virtual channel support for full isochronous data transfers
- Card edge connector

PCI Bus Interface

Compliant with 2.3 Specification at 33 MHz

- System master operation
- Support for 32-bit addressing on PCI using DAC protocol
- Four available PCI REQ/GNT pairs
- 5.0V compatible
- Card edge connector

Mini-PCI Interface

Compliant with Mini-PCI Specification rev. 1.0

- Type IIIB modules support
- Onboard connector

ISA Bus Interface

Compliant with PICMG rev. 1.0 Specification.
Available via LPC-ISA bridge or PCI-ISA bridge

- 16-bit interface
- Card edge connector

Serial Ports

Two software switchable ports COM1 and COM2:

- RS-232 through two 10-pin IDC connectors on board
- Isolated RS-485 via two 10-pin IDC connectors on board
- 16C550 compatible UARTs

USB Interface

Up to eight USB 2.0 ports supporting UHCI and EHCI:

- Two USB type A sockets at the board slot bracket
- Six USB 2.0 channels via three 10-pin IDC connectors on board

Parallel Port

Multi-Mode™ bidirectional parallel port:

- Standard Mode IBM PC/XT, PC/AT, and PS/2 compatible
- SPP standard rate
- EPP (Enhanced Parallel Port) v.1.7 and 1.9 compatible
- ECP (Extended Capability Port) compatible
- 26-pin IDC connector on board

LAN Interface

Two 10/100/1000 Mb/s Gigabit Ethernet interfaces
(one Fast Ethernet and one Gigabit Ethernet interfaces – option)
based on the Intel 82573 Ethernet PCI-E bus controllers.

- Two RJ45 connectors at the board slot bracket
- Automatic mode recognition
- Automatic cabling configuration recognition
- Cabling requirement: Category 5, UTP, four (two)-pair cabling

VGA Interface

Built-in Intel 2D/3D high performance graphics accelerator

- Supports resolutions of up to 2048 x 1536, 16 bit at 75 Hz refresh rate
- Hardware motion compensation for software MPEG2 and MPEG4 decoding
- Video memory up to 64 MB shared with system
- 15-pin D-sub VGA CRT-display connector at the board slot bracket

Audio Interface

AC'97 compatible, LM4550 audio codec

- 10-pin IDC connector on board
- Line In/Out, Microphone In

Keyboard and Mouse

Super I/O support for PS/2 keyboard and mouse:

- Available via a 7-pin connector on board
- Mouse and keyboard simultaneous connection is possible via Y-cable

Mass Storage

EIDE Ultra ATA/100/66/33

- One channel is shared by CompactFlash interface and EIDE devices
- Up to two devices (hard disks or CD-ROMs)
- 40-pin onboard IDC connector

Serial ATA interface

- Up to four onboard connectors (two with ICH6M)
- Data transfer rates up to 150 MB/s

CompactFlash:

- CompactFlash type I/II on-board socket (true IDE mode),
  supports type I or type II CompactFlash cards
- DMA modes supported as per CompactFlash Specification v.4.1

Floppy Disk interface:

- Supports 5.25 or 3.5 inch floppy drives
- 1.44 or 2.88 MB 3.5 inch floppy disks
- 34-pin onboard IDC connector

1.4.3 Control and Monitoring

Thermal Management

The processor is protected from overheating by:

- Internal processor temperature control unit, which initiates CPU shut down
- Processor die temperature monitor
- Heatsink

Temperature Monitor

LM87 hardware monitor is used for supervision of the on-die CPU temperature and the board surface temperature

LEDs (option)

System status:

- Suspend Power On (red)
- IDE/SATA activity (onboard header)
- Power LED (green)

Gigabit/Fast Ethernet status (1 and 2):

- Line (green): Line connected
- Act (green): Network activity

Reset Input

- Onboard reset header

Soft Power On

- Onboard soft power header

ATX Power Supply

- 20-contact standard ATX power connector

1.4.4 General

Mechanical

PICMG form factor

Dimensions:	122 × 338 mm
Board Weight:	305 g (to be amended)
Shock/Vibration:	15G / 2G

Power Supply

3 A @ 3.3 V; 7 A @ 5 V; 0.12 A @ 12 V (to be amended)

See Chapter 6 for details on supply voltages and power supply requirements

Temperature Ranges

Operational:	-10°C ... +70°C
Storage:	-55°C ... +95°C

Humidity

5% to 95% RH, non-condensing

Battery

3.0 V lithium battery for RTC in a battery holder. Use PANASONIC BR2032 or compatible

1.4.5 Software

Software BIOS

Flash memory based enhanced Phoenix® BIOS has the following features:

- BIOS boot support for USB keyboards
- Software enable/disable function for the Ethernet, and COM ports configuration
- Plug&Play capability

Operating Systems

Supported operating systems:

- Microsoft® DOS v.3.30 – 6.22
- Microsoft® Windows® 2000, XP, CE, XP Embedded
- Linux®
- QNX® v.4.20, 6.0

1.5 Delivery Checklist

The CPC1100 supplied set includes:

1. CPC1100 SBC
2. CD-ROM with documentation and service software
3. Antistatic bag
4. Consumer carton box
5. Cables

   (to be specified)

Note:

Keep the antistatic bag and the original package at least until the warranty period is over. It can be used for future storage or warranty shipments.

Chapter 2

Detailed Description

This page was intentionally left blank.

2 Detailed Description

2.1 Processor, Memory and Chipset

2.1.1 Processor

The CPC1100 board is based on the Intel® Pentium® M processor in the μFCPGA478 or μFCBGA478 packages operating at frequencies of up to 2 GHz.

Intel® Pentium® M processor combines high performance and low power consumption. Its enhanced performance characteristics are provided by a newly designed processor core with an integrated 64 KB L1 (32 KB instruction cache and 32 KB write-back data cache) and 2048 KB L2 cache.

The Intel® Pentium® M processor supports the Intel SpeedStep® enhanced technology to control power consumption and processor die temperature by switching the processor core voltage and frequency between several modes without resetting the system.

Important performance features of the Intel Pentium M processor also include

- Intel® Architecture with Dynamic Execution
- Data Prefetch Logic
- L2 cache memory with Advanced Transfer Cache Architecture
- Streaming SIMD extensions 2 (SSE2)
- 400/533 MHz, source-synchronous FSB
- Support for MMX™ technology and Internet Streaming SIMD instructions

The Ultra Low Voltage Pentium M processor is optional.

2.1.2 System Memory

The board bears two 240-pin memory slots. Total capacity of the installed DDR2 SDRAM modules can be up to 2 GB. The installed memory is PC4200 compliant and supports PC SPD (Serial Presence Detect) Specification.

2.1.3 Chipset

The CPC1100 chipset consists of the following devices:

- 82915GM Graphics and Memory Controller Hub (GMCH) with Accelerated Hub Architecture (AHA) bus
- ICH6 I/O Controller Hub with AHA bus (ICH6M optionally)
- One 8 Mbit Firmware Hub (FWH)

The GMCH provides interface for the microprocessor, the memory bus, the PCI Express x16 in the case of an external graphics controller, and includes a high performance graphics accelerator. In the current version of the board the support of an external graphics controller is not realized.
The ICH is a centralized controller for I/O peripherals of the board, such as the PCI, PCI-Express, USB 2.0, EIDE, SATA and AC97 interface. The Firmware Hub (FWH) with capacity of 1 MB is used as the non-volatile storage for BIOS.

North Bridge

The 915GM Graphics and Memory Controller Hub (GMCH) in the 1257µFCBGA package provides interfaces with the central processor, with the dual channel DDR2 SDRAM system memory, and interface to high performance internal graphics or PCI Express x16 interface (not supported by CPC1100) for an external VGA controller. It also provides a DMI interface to the ICH.

The 915GM is optimized for the Intel® Pentium® M family of microprocessors. The chipset supports a PSB frequency of 400/533 MHz with AGTL+ signaling. For single processor systems the single ended AGTL termination is supported. It also supports 32-bit addressing for using up to 4 GB memory address space. The 915GM includes a system memory controller with a 64-bit interface. The chipset supports up to PC4200 dual or single channel DDR2 SDRAMs for use as system memory.

When running in internal graphics mode, high performance video capabilities of the 915GM are supported by a 2D/3D graphics accelerator and H/W Motion Compensation engines for software MPEG2 decoding. The internal graphics controller allows connection of a standard CRT display.

South Bridge

The ICH6 (ICH6M) is a multifunctional I/O Controller Hub that provides interfaces to the PCI-Express and PCI buses and to a number of PC interfaces, such as UltraDMA 100/66/33, USB 2.0 host interface, LPC interface, FWH Flash BIOS interface, SATA, and an AC'97 digital audio. The ICH communicates with the host controller directly via a dedicated DMI interface.

I/O Controller Hub features are:

- PCI 2.3 interface with eight IRQ inputs
- PCI-Express Bus four 1x or one 4x
- Bus Master EIDE controller UltraDMA 100/66/33
- SATA interface, four channels (two for ICH6M)
- USB controller supporting eight USB 2.0 ports
- DMI interface with 915GM
- LPC interface
- AC'97 2.1 interface or High Definition audio interface
- RTC controller
- Additional timer

2.2 Internal Peripherals

The following internal peripherals are available on the CPC1100 module:

2.2.1 Flash Memory

There are two flash devices available - one is used for the BIOS storage, and one is a CompactFlash card in the socket.

2.2.1.1 CompactFlash

The CPC1100 has a standard Compact Flash type I/II socket, which can accept CompactFlash memory card for use as a disk drive connected to IDE channel. The CompactFlash socket is located on the bottom side of the board.

2.2.2 Timers

CPC1100 is equipped with the following timers:

- **RTC – Real-Time Clock**

The ICH contains a MC146818A-compatible real-time clock. The RTC includes 256 bytes of battery-backed CMOS RAM. The RTC features include timekeeping with alarm function and 100-year calendar, as well as programmable periodic interrupt. A coin-cell battery powers the real-time clock and CMOS memory.

- **Counter/Timer**

Three 8254-type counters/timers are available on the CPC1100.

- **Additional Timer**

The ICH includes an additional programmable timer, which prevents system hang-ups during start-ups. After the first time-out period is over, it generates the SMI# signal, which starts the software hang-up recovery subroutine. If the second timeout ends, the "Reset" signal is issued to recover the system from the hardware hang-up state.

2.2.3 Local SMBus Devices

The CPC1100 incorporates a System Management Bus to access several system monitoring and control devices via a two-wire I^{2}C™ bus interface. The following table presents functions and addresses of onboard SMBus devices.

Table 2-1: SMBus Devices

№	SMB Address	Device
1	0D2H	CY28411 System clock generator
2	0A0H	SPD EEPROM Module
3	0A2H	SPD EEPROM Module
4	9CH	LM87 Temperature Sensor

2.2.3.1 Temperatures Monitoring

The integrated LM87 temperature sensor monitors the processor and board surface temperatures to make sure that the system is operating at a safe temperature. On request, LM87 can report the current processor and board temperatures to the software responsible for the module operation mode.

2.2.3.2 Serial EEPROM

SPD serial EEPROM is a part of DIMM memory module. This nonvolatile memory is used by the system and is not available for user.

2.2.4 Battery

The CPC1100 utilizes a 3.0 V lithium battery for the RTC and CMOS memory backup. Use PANASONIC BR2032 or compatible.

2.3 Module Interfaces

2.3.1 Edge Connectors

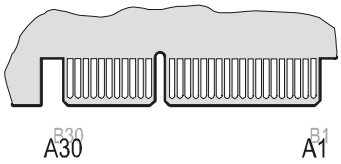
CPC1100 is equipped with three edge connectors: PCI Express, PCI and ISA. PCI and ISA edge connectors location conforms to the PICMG 1.0 specification. The PCI Express edge connector has been added to further expand the board's I/O capabilities.

2.3.1.1 PCI Express Edge Connector

The CPC1100 PCI Express interface is fully compliant with the PCI Express 1.0a specification. It supports four PCI Express root ports, and can be statically configured as four x1, or one x4 lanes. Two virtual channels are supported for full isochronous data transfers. PCI Express interface provides full 2.5 Gb/s bandwidth in each direction per x1 lane.

This interface is available only in special customized version of CPC1100.

Figure 2-1: PCI Express Edge Connector



CPC1100 is equipped with PCI Express edge connector, which allows for data exchange via four x1 lanes or one x4 lane depending on software configuration.

The pinout is presented below.

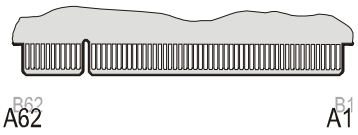
Table 2-2: PCI Express Bus Connector Pinout

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
PCIE_A1	GND	PCIE_A16	GND	PCIE_B1	GND	PCIE_B16	GND
PCIE_A2	HSOp(0)	PCIE_A17	REFCLK1-	PCIE_B2	REFCLK2+	PCIE_B17	HSOn(3)
PCIE_A3	HSOn(0)	PCIE_A18	REFCLK1+	PCIE_B3	REFCLK2-	PCIE_B18	HSOp(3)
PCIE_A4	GND	PCIE_A19	GND	PCIE_B4	GND	PCIE_B19	GND
PCIE_A5	HSIn(0)	PCIE_A20	+3_3V	PCIE_B5	HSIp(2)	PCIE_B20	+3_3V
PCIE_A6	HSIp(0)	PCIE_A21	SMBCLK	PCIE_B6	HSIn(2)	PCIE_B21	+3_3V_AUX
PCIE_A7	GND	PCIE_A22	SMBDATA	PCIE_B7	GND	PCIE_B22	PRSNT#2_S0
PCIE_A8	REFCLK0-	PCIE_A23	+3_3V	PCIE_B8	HSOn(2)	PCIE_B23	PRSNT#2_S1
PCIE_A9	REFCLK0+	PCIE_A24	PRSNT#1_S0	PCIE_B9	HSOp(2)	PCIE_B24	PRSNT#2_S2
PCIE_A10	GND	PCIE_A25	PRSNT#1_S1	PCIE_B10	GND	PCIE_B25	PRSNT#2_S3
PCIE_A11	HSOp(1)	PCIE_A26	PRSNT#1_S2	PCIE_B11	REFCLK3+	PCIE_B26	PWRGD_S0
PCIE_A12	HSOn(1)	PCIE_A27	PRSNT#1_S3	PCIE_B12	REFCLK3-	PCIE_B27	PWRGD_S1
PCIE_A13	GND	PCIE_A28	WAKE#	PCIE_B13	GND	PCIE_B28	PWRGD_S2
PCIE_A14	HSIn(1)	PCIE_A29	+12V	PCIE_B14	HSIp(3)	PCIE_B29	PWRGD_S3
PCIE_A15	HSIp(1)	PCIE_A30	+12V	PCIE_B15	HSIn(3)	PCIE_B30	+12V

2.3.1.2 PCI Edge Connector

PCI Bus Interface of CPC1100 complies with requirements of PCI Rev 2.3 Specification and operates at 33 MHz. It delivers seven PCI REQ/GNT pairs and provides support for 64-bit addressing on PCI using DAC protocol.

Figure 2-2: PCI Edge Connector



CPC1100 is equipped with 124-contact PCI edge connector.

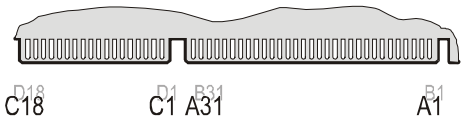
Its pinout is presented below.

Table 2-3: PCI Bus Connector Pinout

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
PCI_A1	TRST#	PCI_A32	AD16	PCI_B1	-12V	PCI_B32	AD17
PCI_A2	+12V	PCI_A33	+3_3V	PCI_B2	TCK	PCI_B33	C_BE2#
PCI_A3	TMS	PCI_A34	FRAME#	PCI_B3	GND	PCI_B34	GND
PCI_A4	TDI	PCI_A35	GND	PCI_B4	TDO	PCI_B35	IRDY#
PCI_A5	+5V	PCI_A36	TRDY#	PCI_B5	+5V	PCI_B36	+3_3V
PCI_A6	INTA#	PCI_A37	GND	PCI_B6	+5V	PCI_B37	DEVSEL#
PCI_A7	INTC#	PCI_A38	STOP#	PCI_B7	INTB#	PCI_B38	GND
PCI_A8	+5V	PCI_A39	+3_3V	PCI_B8	INTD#	PCI_B39	LOCK#
PCI_A9	CLKC	PCI_A40	SDONE	PCI_B9	REQ3#	PCI_B40	PERR#
PCI_A10	+5V_IO	PCI_A41	SB0#	PCI_B10	REQ1#	PCI_B41	+3_3V
PCI_A11	CLKD	PCI_A42	GND	PCI_B11	GNT3#	PCI_B42	SERR#
PCI_A12	GND	PCI_A43	PAR	PCI_B12	GND	PCI_B43	+3_3V
PCI_A13	GND	PCI_A44	AD15	PCI_B13	GND	PCI_B44	C_BE1#
PCI_A14	GNT1#	PCI_A45	+3_3V	PCI_B14	CLKA	PCI_B45	AD14
PCI_A15	RST#	PCI_A46	AD13	PCI_B15	GND	PCI_B46	GND
PCI_A16	+5V_IO	PCI_A47	AD11	PCI_B16	CLKB	PCI_B47	AD12
PCI_A17	GNT0#	PCI_A48	GND	PCI_B17	GND	PCI_B48	AD10
PCI_A18	GND	PCI_A49	AD9	PCI_B18	REQ0#	PCI_B49	GND
PCI_A19	REQ2#			PCI_B19	+5V_IO		
PCI_A20	AD30			PCI_B20	AD31		
PCI_A21	+3_3V	PCI_A52	C_BE0#	PCI_B21	AD29	PCI_B52	AD8
PCI_A22	AD28	PCI_A53	+3_3V	PCI_B22	GND	PCI_B53	AD7
PCI_A23	AD26	PCI_A54	AD6	PCI_B23	AD27	PCI_B54	+3_3V
PCI_A24	GND	PCI_A55	AD4	PCI_B24	AD25	PCI_B55	AD5
PCI_A25	AD24	PCI_A56	GND	PCI_B25	+3_3V	PCI_B56	AD3
PCI_A26	GNT2#	PCI_A57	AD2	PCI_B26	C_BE3#	PCI_B57	GND
PCI_A27	+3_3V	PCI_A58	AD0	PCI_B27	AD23	PCI_B58	AD1
PCI_A28	AD22	PCI_A59	+5V_IO	PCI_B28	GND	PCI_B59	+5V_IO
PCI_A29	AD20	PCI_A60	REQ64#	PCI_B29	AD21	PCI_B60	ACK64#
PCI_A30	GND	PCI_A61	+5V	PCI_B30	AD19	PCI_B61	+5V
PCI_A31	AD18	PCI_A62	+5V	PCI_B31	+3_3V	PCI_B62	+5V

2.3.1.3 ISA Edge Connector

Figure 2-3: ISA Edge Connector



CPC1100 is equipped with 16-bit ISA 98-contact edge connector.

The pinout is presented below.

ISA connector pinout appears on the following page.

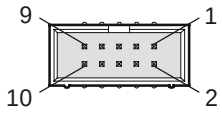
Table 2-4: ISA Bus Connector Pinout

Pin	A	B	C	D
1	IOCHCHK#	GND	SBHE#	MEMCS16#
2	SD7	RESETDRV	LA23	IOCS16#
3	SD6	+5V	LA22	IRQ10
4	SD5	IR9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	ENDXFR#	LA17	DACK0#
9	SD0	+12V	MEMR#	DRQ0
10	IOCHRDY	GND	MEMW#	DACK5#
11	AEN	SMEMW#	SD8	DRQ5
12	SA19	SMEMR#	SD9	DACK6#
13	SA18	IOW#	SD10	DRQ6
14	SA17	IOR#	SD11	DACK7#
15	SA16	DACK3#	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	DACK1#	SD14	MASTER#
18	SA13	DRQ1	SD15	GND
19	SA12	REFRSH#		
20	SA11	SYSCLK		
21	SA10	IRQ7		
22	SA9	IRQ6		
23	SA8	IRQ5		
24	SA7	IRQ4		
25	SA6	IRQ3		
26	SA5	DACK2#		
27	SA4	TC		
28	SA3	BALE		
29	SA2	+5V		
30	SA1	OSC		
31	SA0	GND		

2.3.2 Serial Interfaces (RS232 and RS485)

Serial interfaces are available via four onboard 10-pin IDC connectors – J22, J23, J24, and J38. Both COM1 and COM2 ports are software switchable between two modes: RS232 and optoisolated RS485. Each port uses two separate connectors for these operation modes. All COM ports are fully compatible with the 16550 controller and include a complete set of handshaking and modem control signals, maskable interrupt generation and data transfer of up to 460.8 Kb/s.

Figure 2-1: IDC10 Header



The following table gives the pinouts of the onboard serial IDC connectors.

Table 2-5: RS232 Connector (J22, J23) Pinout

Pin	Designation	Pin	Designation
1	DCD	6	CTS
2	DSR	7	DTR
3	RXD	8	RIN
4	RTS	9	GND
5	TXD	10	NC

Table 2-6: RS485 Connector (J24, J38) Pinout

Pin	Designation	Pin	Designation
1	+TRXD	6	NC
2	–TRXD	7	NC
3	GND	8	NC
4	GND	9	GND
5	NC	10	GND

Note:

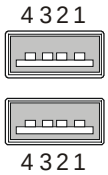
The RS485 interface provides for support of up to 256 network segments. In case the board is supposed to serve as a terminal network device, it is necessary to use a special cable with terminal resistors supplied with the board.

2.3.3 USB Interfaces

The CPC1100 supports eight USB 2.0 ports – two sockets are available via CPC1100 board slot bracket (front panel) and six more via three 10-pin onboard IDC connectors. All USB ports support high-speed, full-speed, and low-speed operation. Hi-speed USB 2.0 supports data transfer rate of up to 480 Mb/s.

One USB device may be connected to each port. To connect more than eight USB devices use an external hub. The USB power supply is protected by a self-resettable 500 mA fuse.

Figure 2-2: Front Panel USB Connectors

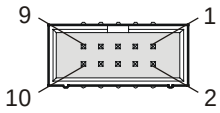


The CPC1100 has two identical 4-pin Type A USB connectors (J11 and J12) on the front panel with the following pinouts:

Table 2-7: Front Panel USB Connectors Pinouts

Pin Number	Name	Function	In/Out
1	VCC	VCC signal	–
2	UV0 -	Differential USB -	In/Out
3	UV0+	Differential USB+	In/Out
4	GND	GND signal	–

Figure 2-3: IDC10 Header



Six more USB ports are available via three onboard 10-pin IDC connectors (J13, J14, and J15) with the following pinouts:

Table 2-8: Onboard USB Connectors Pinouts

Pin Number	Signal	Function	In/Out
1	VCC	VCC signal	–
3	UV0-	Differential USB-	–
5	UV0+	Differential USB+	–
7	GND	GND signal	–
9	NC		
2	VCC	VCC signal	–
4	UV0-	Differential USB-	–
6	UV0+	Differential USB+	–
8	GND	GND signal	–
10	NC		

Note:

The maximum current for each USB port is limited to the amount of 0.5 A by the board's circuitry. All signal lines are EMI-filtered.

2.3.4 Graphics Controller

A highly integrated 2D/3D graphics accelerator is included in the 915GM GMCH. The internal graphics controller provides interfaces to a standard analog monitor (SVGA connector on CPC1100 front panel).

Integrated 2D/3D Graphics features:

- Resolutions up to 1600×1200 at 100 Hz, 1920×1440 at 85 Hz and 2048×1536 at 75 Hz.
- 3D Setup and Render Engine
- 3D Graphics Rasterization Enhancements
- High Quality Texture Engine
- Full 2D hardware acceleration
- Intel® 915GM DVMT graphics core
- Intelligent Memory Management
- Integrated 400 MHz DAC

2.3.4.1 DVM Technology

The Intel® 915GM chipset supports the Dynamic Video Memory Technology (DVMT) v.3.0. This technology provides use of all available memory in the most efficient way for maximum graphics performance. DVMT dynamically responds to requests from applications allocating the required amount of video memory. The Intel® 915GM graphics driver is allowed to request up to 64 MB of system memory. When not needed by the graphics subsystem, the memory is freed up for other applications. Thus, memory usage is balanced for optimal graphics and system memory performance.

To support legacy VGA devices the internal video-controller needs at least 1 MB of system memory. Thus, the reported system memory size is always 1 MB less than available amount of physical memory.

2.3.4.2 Supported Resolutions

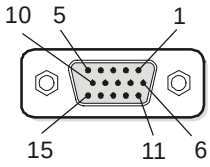
The integrated 400 MHz RAMDAC of the 915GM chipset allows direct connection of a progressive scan analog monitor with a resolution of up to 2048 × 1536 at 75 Hz. The supported resolution depends on the color depth and on the vertical scanning frequency, as illustrated in the table below.

Table 2-9: Supported Display Modes

Display Mode	Color Resolution vs. Vertical Frequency											
	8-bit Indexed				16- bit				32- bit			
	60	75	85	100	60	75	85	100	60	75	85	100
640 × 480	×	×	×	×	×	×	×	×	×	×	×	×
800 × 600	×	×	×	×	×	×	×	×	×	×	×	×
1024 × 768	×	×	×	×	×	×	×	×	×	×	×	×
1280 × 1024	×	×	×	×	×	×	×	×	×	×	×	×
1600 × 1200	×	×	×	×	×	×	×	×	×	×	×	×
1920 × 1440	×	×	×		×	×	×		×	×	×	
2048 × 1536	×	×			×	×			×	×		

2.3.4.3 CRT Interface and Connector

Figure 2-4: SVGA Connector



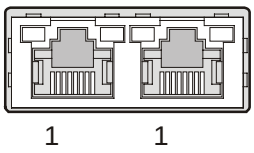
The 15-contact female J10 D-Sub connector on CPC1100 front panel (board slot bracket) is used to connect a CRT monitor to the CPC1100 module. The 75 ohm termination resistors for the red, green and blue video signals are installed on the CPC1100.

Table 2-10: SVGA Front Panel Connector Pinout

Pin Number	Signal	Function	In/Out
1	Red	Red video signal output	Out
2	Green	Green video signal output	Out
3	Blue	Blue video signal output	Out
9	VCC	Power +5V 200 mA	Out
12	DDCdata	I^2C™ data	In/Out
13	Hsync	Horizontal sync.	TTL out
14	Vsync	Vertical sync.	TTL out
15	DDCclk	I^2C™ clock	Out
5, 6, 7, 8	GND	Signal ground	–
4, 10, 11	Free	–	–

2.3.5 Ethernet Ports

Figure 2-5: RJ45 Ethernet Connectors



Two RJ45 Ethernet connectors are located on CPC1100 front panel (board slot bracket). Depending on the board version, they are used by two Gigabit Ethernet interfaces or by one Fast and one Gigabit Ethernet ports.

Version 01 has two 10Base-T/100Base-TX/1000Base-T Ethernet ports based on Intel® 82573 Gigabit Ethernet PCI-Express bus controllers. Version 02 is equipped with one Gigabit Ethernet port (82573 on PCI-Express bus) and one Fast Ethernet port (82562ET).

The Intel® 82573 Gigabit Ethernet controller architecture combines high performance and low power consumption. The controller's features include independent transmit and receive queues to limit PCI-X bus traffic, and a PCI-X interface providing efficient bus utilization by increased use of bursts.

The interfaces provide auto-detection and switching between 10Base-T, 100Base-TX and 1000Base-T operation modes. Each of the two Ethernet channels may be disabled via the BIOS Setup or user software utility to free up system resources.

2.3.5.1 RJ45 Connectors Pinout

RJ45 connectors supply the 10Base-T, 100Base-TX and 1000Base-T interfaces to the front panel (board slot bracket) of CPC1100.

Table 2-11: Front Panel Ethernet Connectors Pinouts

Pin	10Base-T		100Base-TX		1000Base-T	
	I/O	Signal	I/O	Signal	I/O	Signal
1	O	TX+	O	TX+	I/O	BI_DA+
2	O	TX–	O	TX–	I/O	BI_DA–
3	I	RX+	I	RX+	I/O	BI_DB+
4	–	–	–	–	I/O	BI_DC+
5	–	–	–	–	I/O	BI_DC–
6	I	RX–	I	RX–	I/O	BI_DB–
7	–	–	–	–	I/O	BI_DD+
8	–	–	–	–	I/O	BI_DD–

MDI / Standard Ethernet Cable

Integrated Ethernet LEDs

Yellow: Line: This LED indicates network connection. The LED lights up when the line is connected.

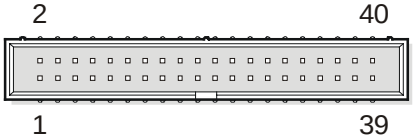
Green: Act: this LED monitors network activity. The LED lights up when network packets are sent or received through the RJ45 port. When this LED is not lit, it means that the computer is not sending or receiving network data.

2.3.6 EIDE Interface

The EIDE interface supports several operation modes: PIO mode, 8237-type DMA mode, Ultra DMA, ATA-66 and ATA-100 modes. In PIO mode the central processor controls the data transfers. In all the DMA modes, the CPU is not engaged in data transfer. DMA modes are similar to each other, but differ in data transfer protocols details and DMA clock frequency, thus providing different transfer rates. The module's chipset ATA-100 logic can provide transfer rates of up to 100 MB/sec (read) and up to 88 MB/sec (write).

The current version of CPC1100 supports one EIDE channel to accommodate a maximum of two devices.

Figure 2-6: HDD Connector



The EIDE channel is routed to standard AT 40-pin on-board IDC connector (J16) and to the CompactFlash socket. It is possible to connect both master and slave devices to this EIDE channel. Maximum IDE cable length is 50 cm.

The pinout of the standard AT HDD connector is shown in the table below.

Table 2-12: Standard EIDE HDD Connector Pinout

Pin Number	Signal	Function	In/Out
1	IDERESET	Reset HD	Out
2	GND	Ground signal	-
3	HD7	HD data 7	In/Out
4	HD8	HD data 8	In/Out
5	HD6	HD data 6	In/Out
6	HD9	HD data 9	In/Out
7	HD5	HD data 5	In/Out
8	HD10	HD data 10	In/Out
9	HD4	HD data 4	In/Out
10	HD11	HD data 11	In/Out
11	HD3	HD data 3	In/Out
12	HD12	HD data 12	In/Out
13	HD2	HD data 2	In/Out
14	HD13	HD data 13	In/Out
15	HD1	HD data 1	In/Out
16	HD14	HD data 14	In/Out
17	HD0	HD data 0	In/Out
18	HD15	HD data 15	In/Out
19	GND	Ground signal	-
20	NC	-	-
21	IDEDRQ	DMA request	In
22	GND	Ground signal	-
23	IOW	I/O write	Out
24	GND	Ground signal	-
25	IOR	I/O read	Out
26	GND	Ground signal	-
27	IOCHRDY	I/O channel ready	In
28	GND	Ground signal	-
29	IDEDACK	DMA Ack	Out
30	GND	Ground signal	-
31	IDEIRQ	Interrupt request	In
32	NC	-	-
33	A1	Address 1	Out
34	NC	-	-
35	A0	Address 0	Out
36	A2	Address 2	Out
37	HCS0	HD select 0	Out
38	HCS1	HD select 1	Out
39	NC	-	-
40	GND	Ground signal	-

Note...

ATA-66 and ATA-100 work at higher frequencies and require a specialized cable, which has additional grounding wires to reduce reflections, noise, and inductive effects. This cable also supports all legacy IDE drives.

The blue end of the ATA-100 cable must be connected to the main board, the gray connector to the UltraDMA/100 slave device and the black connector to the UltraDMA/100 master device.

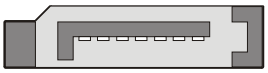
2.3.6.1 HDD LED Connector

Figure 2-7: HDD LED Connector

The onboard HDD LED connector (J8) is used to control an external HDD activity LED indicator. It is lit when any of IDE or SATA channel is active, the data are read or written from/to an external disk drive. Contact “1” should be connected to “+”.

2.3.7 Serial ATA Ports

Figure 2-8: Serial ATA Connector



CPC1100 has two (ICH6M) or four (ICH6) standard SerialATA connectors installed on board. SerialATA drives can be attached to J18, J19, J36, and J37 (J18 and J19 for ICH6M) connectors. The connector's pinout is presented in the table below.

Table 2-13: SATA Connector Pinout

Contact Number	Function
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

It is recommended to use a 45 cm cable for connection of SATA drives.

2.3.8 CompactFlash Socket

To enable usage of CF memory cards CPC1100 has a CompactFlash Type I/II socket located on the bottom side of the board. CF removable mass storage devices are fully compatible with 16-bit ATA/ATAPI-4 IDE interface with DMA support (CF Specification v.4.1).

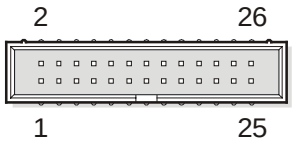
CompactFlash socket is connected to the EIDE port as master at the current version of CPC1100.

Table 2-14: CompactFlash Socket Pinout

Pin Number	Signal	Function	In/Out
1	GND	Ground signal	–
2	D03	Data 3	In/Out
3	D04	Data 4	In/Out
4	D05	Data 5	In/Out
5	D06	Data 6	In/Out
6	D07	Data 7	In/Out
7	IDE_CS0	Chip select 0	Out
8	GND (A10)	–	–
9	GND (ATASEL)	–	–
10	GND (A09)	–	–
11	GND (A08)	–	–
12	GND (A07)	–	–
13	3.3 V	3.3 V power	–
14	GND (A06)	–	–
15	GND (A05)	–	–
16	GND (A04)	–	–
17	GND (A03)	–	–
18	A02	Address 2	Out
19	A01	Address 1	Out
20	A00	Address 0	Out
21	D00	Data 0	In/Out
22	D01	Data 1	In/Out
23	D02	Data 2	In/Out
24	NC (IOCS16)	–	–
25	NC (CD2)	–	–
26	NC (CD1)	–	–
27	D11	Data 11	In/Out
28	D12	Data 12	In/Out
29	D13	Data 13	In/Out
30	D14	Data 14	In/Out
31	D15	Data 15	In/Out
32	IDE_CS1	Chip select 1	Out
33	NC (VS1)	–	–
34	DIOR	I/O read	Out
35	DIOW	I/O write	Out
36	3.3 V (WE)	3.3 V power	–
37	INTRQ	Interrupt	In
38	3.3 V	3.3 V power	–
39	CSEL (GND pull-up)	Master/Slave	Out
40	NC (VS2)	–	–
41	Reset	Reset	Out
42	IORDY	I/O ready	In
43	REQ#	DMA request	Out
44	ACK#	DMA acknowledge	In
45	NC (ACTIVE)	–	–
46	NC (PDIAG)	–	–
47	D08	Data 08	In/Out
48	D09	Data 09	In/Out
49	D10	Data 10	In/Out
50	GND	–	–

2.3.9 Parallel Port Interface

Figure 2-9: LPT Connector



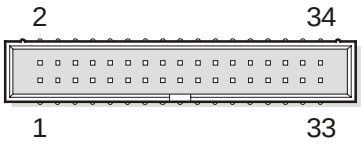
Standard parallel port (IEEE1284, SPP/ECP/EPP) is available through a 26-pin onboard IDC connector. To use standard parallel port devices a special adapter is necessary.

Table 2-15: LPT Connector Pinout

Pin Number	Signal	In/Out	Pin Number	Signal	In/Out
1	STROBE	Out	14	GND	–
2	AUTOFD	Out	15	PD6	In/Out
3	PD0	In/Out	16	GND	–
4	ERROR	In	17	PD7	In/Out
5	PD1	In/Out	18	GND	–
6	INIT	Out	19	ACK	In
7	PD2	In/Out	20	GND	–
8	SLCTIN	Out	21	BUSY	In
9	PD3	In/Out	22	GND	–
10	GND	–	23	PE	In
11	PD4	In/Out	24	GND	–
12	GND	–	25	SLCT	In
13	PD5	In/Out	26	GND	–

2.3.10 Floppy Drive Interface

Figure 2-10: FDD Connector



The CPC1100 is provided with a 2-row 34-pin standard IDC onboard FDD connector, which provides the signals for up to two floppy disk drives. The onboard floppy disk controller supports either 5.25 inch or 3.5 inch (1.44 or 2.88 MB) floppy disks.

Warning!

Pay attention to the correct connection of the floppy drive cable. Please, note that cable inversion will lead to continuous operation of the floppy drive; this may damage the diskette in it.

Table 2-16: FDD Connector Pinout

Pin Number	Signal	Function	In/Out
2	SELECT0	Density Select 0	Out
4	NC	-	-
6	SELECT1	Density Select 1	Out
8	INDEX	Index pulse	In
10	MOTEN1	Motor 1 enable	Out
12	DRVSEL2	Driver select 2	Out
14	DRVSEL1	Driver select 1	Out
16	MOTEN2	Motor 2 enable	Out
18	DIRECTION	Step direction	Out
20	STEP	Step pulse	Out
22	WRDATA	Write data	Out
24	WREN	Write enable	Out
26	TRACK0	Track 0 signal	In
28	WRPROT	Write protect	In
30	RDDATA	Read data	In
32	HEADSEL	Head select	Out
34	DSKCHG	Disk change	In
Odd Numbers	GND	GND	-

2.3.11 MiniPCI Socket

Figure 2-11: MiniPCI Socket

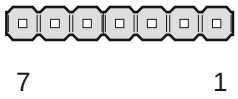
The J26 onboard connector is a Type IIIB 124-contact MiniPCI socket. It allows installation of one MiniPCI expansion module. The pinout of this connector is shown in the following table.

Table 2-17: MiniPCI Connector Pinout

Pin #	Signal	Pin #	Signal	Pin #	Signal
1	TIP	43	RSVD2	85	AD[08]
2	RING	44	AD[26]	86	C/BE[0]#
3	8PMJ-3	45	C/BE[3]#	87	AD[07]
4	8PMJ-13	46	AD[24]	88	3.3V_8
5	8PMJ-6	47	AD[23]	89	3.3V_4
6	8PMJ-23	48	IDSEL	90	AD[06]
7	8PMJ-7	49	GND_4	91	AD[05]
8	8PMJ-43	50	GND_11	92	AD[04]
9	8PMJ-8	51	AD[21]	93	RSVD3
10	8PMJ-53	52	AD[22]	94	AD[02]
11	LED1_GRNP	53	AD[19]	95	AD[03]
12	LED2_YELP	54	AD[20]	96	AD[00]
13	LED1_GRNN	55	GND_5	97	5V_1
14	LED2_YELN	56	PAR	98	RSVD9_WIP5
15	CHSGND	57	AD[17]	99	AD[01]
16	RSVD5	58	AD[18]	100	RSVD10_WIP5
17	INTB#	59	C/BE[2]#	101	GND_9
18	5V_2	60	AD[16]	102	GND_15
19	3.3V_1	61	IRDY#	103	AC_SYNC
20	INTA#	62	GND_12	104	M66EN
21	RSVD1	63	3.3V_3	105	AC_SDATA_IN
22	RSVD6	64	FRAME#	106	AC_SDATA_OUT
23	GND_1	65	CLKRUN#	107	AC_BIT_CLK
24	3.3VAUX1	66	TRDY#	108	AC_CODEC_ID0#
25	CLK	67	SERR#	109	AC_CODEC_ID1#
26	RST#	68	STOP#	110	AC_RESET#
27	GND_2	69	GND_6	111	MOD_AUDIO_MON
28	3.3V_5	70	3.3V_7	112	RSVD8
29	REQ#	71	PERR#	113	AUDIO_GND1
30	GNT#	72	DEVSEL#	114	GND_16
31	3.3V_2	73	C/BE[1]#	115	SYS_AUDIO_OUT
32	GND_10	74	GND_13	116	SYS_AUDIO_IN
33	AD[31]	75	AD[14]	117	SYS_AUDIO_OUT_GND
34	PME#	76	AD[15]	118	SYS_AUDIO_IN_GND
35	AD[29]	77	GND_7	119	AUDIO_GND2
36	RSVD7	78	AD[13]	120	AUDIO_GND3
37	GND_3	79	AD[12]	121	RSVD4
38	AD[30]	80	AD[11]	122	MPCIACT#
39	AD[27]	81	AD[10]	123	VCC5VA
40	3.3V_6	82	GND_14	124	3.3VAUX2
41	AD[25]	83	GND_8		
42	AD[28]	84	AD[09]		

2.3.12 Keyboard/Mouse Interface

Figure 2-4: PS/2 Keyboard/Mouse Connector



PS/2 port is available via the 7-contact single-row onboard J21 connector. Mouse and keyboard can be connected simultaneously using Y-cable supplied with CPC1100.

The pinout of this connector is shown in the table below.

Table 2-18: PS/2 Connector J21 Pinout

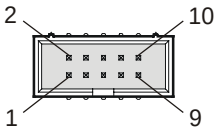
Pin Number	Signal	Pin Number	Signal
1	VCC 5 V	5	MCLK
2	KBDDAT	6	GND
3	KBDCLK	7	NC
4	MDAT	–	–

Note:

All keyboard/mouse signal lines are EMI-filtered.

2.3.13 Audio Connector

Figure 2-12: IDC-10 Audio Connector



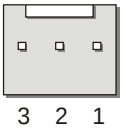
A number of audio interfaces are available via an onboard IDC-10 connector J31. Please, find its pin destination below.

Table 2-19: Audio Connector Pinout

Pin Number	Signal	Pin Number	Signal
1	LINE_OUT_L	6	LINE_IN_R
2	LINE_OUT_R	7	GND
3	GND	8	GND
4	GND	9	MIC_IN
5	LINE_IN_L	10	MIC_BIAS

2.3.14 Fan Connectors

Figure 2-13: Fan Connector



There are two 3-pin (2.54 mm) fan connectors mounted on the CPC1100 board. They are used for connection of cooling fans: J33 – for CPU cooling fan, J32 – for system fan.
The pinout of these connectors is presented in the table below.

Table 2-20: Controllable Fan (J33) Connector Pinout

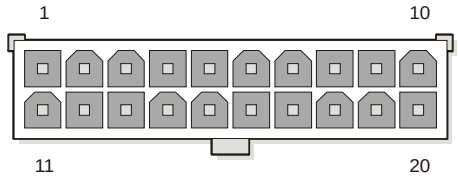
Pin Number	Function
1	GND
2	CTRL
3	TACH

Table 2-21 Uncontrollable Fan (J32) Connector Pinout

Pin Number	Function
1	GND
2	+12V
3	NC

2.3.15 ATX Power Connector

Figure 2-14: External ATX Power Supply Connector



The standard 2-row 20-pin connector for ATX power supply is located on the board near the processor socket. The pinout of this connector is shown in the table below.

Table 2-22: ATX Power Supply Connector Pinout

Pin Number	Signal	Pin Number	Signal
1	3,3V	11	3,3V
2	3,3V	12	-12V
3	GND	13	GND
4	5V	14	PSON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PWROK	18	-5V
9	5VSB	19	5V
10	12V	20	5V

2.3.16 Other Connectors

A group of three 2-pin connectors next to memory sockets consists of Soft Power switch connector (J29), Reset switch connector (J30), and HDD LED connector (J8). J29 and J30 are used for connection of standard remote control buttons.

Moreover, the board has a 2-pin Clear CMOS jumper switch (J7) and 6-pin FSB Frequency Selection Switch (J4+J5). The details on these jumper switches and their usage can be found in Chapter 4 of this Manual.

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Chapter 3

Installation

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3 Installation

The CPC1100 is easy to install. However, it is necessary to follow the procedures and safety regulations below to install the module correctly without damage to the hardware, or harm to personnel.

The installation of the peripheral drivers is described in the accompanying information files. For details on installation of an operating system, please refer to the relevant software documentation.

3.1 Safety Regulations

The following safety regulations must be observed when installing or operating the CPC1100. Fastwel assumes no responsibility for any damage resulting from infringement of these rules.

Warning!

When handling or operating the module, special attention should be paid to the heatsink, because it can get very hot during operation. Do not touch the heatsink when installing or removing the module.

Moreover, the module should not be placed on any surface or in any kind of package until the module and its heatsink have cooled down to ambient temperature.

Caution!

If your module does not allow hotswapping, switch off the system power before installing the module in a free slot. Disregarding this requirement could be harmful for your life or health and can damage the module or entire system.

ESD Sensitive Equipment!

This product comprises electrostatically sensitive components. Please follow the ESD safety instructions to ensure module's operability and reliability:

- Use grounding equipment, if working at an anti-static workbench. Otherwise, discharge yourself and the tools in use before touching the sensitive equipment.
- Try to avoid touching contacts, leads and components.

Extra caution should be taken in cold and dry weather.

3.2 Installation Procedure

To install CPC1100 in a system, follow the instructions below.

1. Keep to the safety regulations of the Section 3.1 when performing the following operations.

Warning!

Failure to accomplish the following instruction may damage the module or result in incorrect system operation.

2. Ensure that the module configuration corresponds to the application requirements before installing. For information regarding the configuration of the CPC1100, refer to Chapter 4. For the installation of CPC1100 specific peripheral devices, expansion modules, and I/O devices refer to the appropriate sections in Chapter 3.
3. To install the CPC1100:
    1. Make sure that no power is connected to the system.
    2. Avoiding contact with other modules of the system, carefully insert the module into the chosen slot until it contacts the baseboard connectors. Make sure the rear mounting bracket slides along the guide.
    3. Check whether edge connectors are properly aimed and gently press until the edge connectors are fully engaged with the baseboard connectors. Do not apply extra force pushing the module into the baseboard connectors.
    4. Fix the module by screwing in the board slot bracket with retaining screw.
    5. Connect the required external interfacing cables to the module's connectors and make sure that the module and all connected cables are properly fixed.

The CPC1100 is now ready for operation. Please, refer to appropriate software, application, and system manuals to get further instructions.

3.3 Removal Procedure

To remove the module from the system case do the following:

1. When performing the next actions, keep to safety regulations of the Section 3.1. Pay special attention to the temperature of the heatsink!
2. Ensure that the system power is switched off before proceeding.
3. Disconnect all cables that may be connected to the module.
4. Unscrew the board slot bracket retaining screw.
6. Carefully pull the module out of the slot. Do not touch the heatsink, since it can get very hot during operation.
7. Dispose of the module at your discretion. The module should not be placed on any surface or in any form of package until the board and the heatsink have cooled down to room temperature.

3.4 Peripheral Devices Installation

Many peripheral devices can be connected to the CPC1100. Their installation procedures differ significantly. Therefore, the following sections provide mainly general guidelines regarding installation of peripheral devices.

The details on external devices connection can be found in documentation supplied with these devices.

3.4.1 USB Devices Installation

The CPC1100 can accept Plug&Play connection of USB 2.0 computer peripheral devices (printers, keyboards, mice, etc.) All USB devices may be connected or disconnected while the host power is on.

3.4.2 CompactFlash Cards Installation

CompactFlash socket of CPC1100 supports only 3.3 V CompactFlash ATA type I/II cards.

Note:

Connection of the CompactFlash cards while the power is on may damage your system.

Carefully slide in the correctly oriented card and gently press to engage the contacts completely.

Note:

It is recommended to use CompactFlash-cards, which has been initialized and formatted in this module.
By default, CPC1100 utilizes LBA mode. Utilization of CompactFlash cards, which has been initialized and formatted in another mode, may lead to errors in operation of the module.

3.4.3 Battery Replacement

The lithium battery must be replaced with Panasonic BR2032 or a battery with similar characteristics.

The expected life of a 190 mAh battery (Panasonic BR2032) is about 5 years. However, this typical value may vary because battery life depends on the operating temperature and the shutdown time of the system in which the battery is installed.

Note...

It is recommended to replace the battery after approximately 4 years to be sure it is operational.

Important:

Replacing the battery, make sure the polarity is correct ("+" up).

Dispose of used batteries according to the local regulations.

Chapter 4

Configuration

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4 Configuration

4.1 Clear CMOS Jumper Description

If the system does not boot (due to, for example, the wrong BIOS configuration or incorrect password) the settings stored in CMOS may be cleared using jumper “Clear CMOS” (J7).

Procedure for clearing CMOS settings:

1. Switch off the system power
2. Set the “Clear CMOS” jumper into the closed position
3. Wait for at least 10 seconds. CMOS setting are reset to factory defaults
4. Set the “Clear CMOS” jumper back to the open position
5. Switch the power on
6. Configure the system using the BIOS Setup program

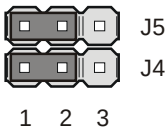
4.2 FSB Frequency Selection Switch

A group of jumper switches J4 and J5 allows to select the front side bus frequency. These jumpers should be set prior to switching the power on. Allowed jumper positions are showed below.

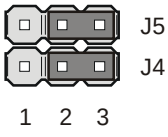
Warning!

All actions should be performed when the power is disconnected.

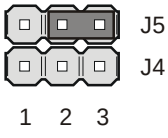
Figure 4-1: FSB Frequency Selection



The contact pins 1 and 2 are closed on both J4 and J5 jumper switches. FSB frequency is defined by the CPU (CPU defined FSB frequency)



The contact pins 2 and 3 are closed on both J4 and J5 jumper switches. FSB frequency is set to 533 MHz.



The contact pins 2 and 3 on J5 are closed and J4 contacts are open. FSB frequency is set to 400 MHz.

4.3 Interrupts Handling

Interrupt handling of the CPC1100 module corresponds to the standard AT IRQ mapping (8259 IRQ controller integrated in the chipset). The functions of the interrupts described below are the default ones, but can be modified via the BIOS Setup.

Table 4-1: Interrupt Settings

IRQ	Priority	Standard Function
IRQ0	1	System Timer
IRQ1	2	Keyboard Controller
IRQ2	–	Second IRQ controller input (IRQ8-IRQ15)
IRQ3	11	COM2
IRQ4	12	COM1
IRQ5	13	Reserved
IRQ6	14	Floppy Disk Controller
IRQ7	15	LPT
IRQ8	3	System RTC
IRQ9	4	PCI or ACPI
IRQ10	5	PCI or Ethernet ports
IRQ11	6	PCI
IRQ12	7	PCI or PS/2 mouse
IRQ13	8	Coprocessor error
IRQ14	9	Primary IDE channel
IRQ15	10	Secondary IDE channel
NMI	–	Reserved

4.3.1 On-board PCI Interrupts

The ICH handles up to 8 PCI interrupt inputs. The table below describes the connected to these PIRQs PCI devices and their functions.

Table 4-2: PCI Interrupt Routing

ICH IRQ Input	PCI Device	Internal ICH Function
PIRQA	PCI IRQA or MINI PCI Socket	USB 1.0 controller #1
PIRQB	PCI IRQB or MINI PCI Socket	AC97 + MODEM + SMBUS
PIRQC	PCI IRQC	Storage (IDE/SATA) native mode
PIRQD	PCI IRQD	USB 1.0 controller #2
PIRQE	Free	Free
PIRQF	Free	Free
PIRQG	Free	Free
PIRQH	Security	USB 2.0 controller

The details can be found in the ICH technical documentation.

4.4 Memory Maps

The CPC1100 module employs the standard AT ISA memory mapping. The details of memory mapping are presented in the following subsections.

4.4.1 First Megabyte Memory Map

The following table shows the memory map for the first megabyte:

Table 4-3: First Megabyte Memory Map

Memory Address Range	Size	Function
0xE0000 – 0xFFFFF	128 k	BIOS implemented in FWH Reset vector 0xFFFF0
0xD0000 – 0xDFFFF	64 k	Free
0xCC000 – 0xCFFFF	16 k	Free
0xC0000 – 0xCC800	48 k	VGA card BIOS
0xA0000 – 0xBFFFF	128 k	Normally used as video RAM according to: CGA: 0xB8000-0xBFFFF Monochrome: 0xB0000-0xB7FFF EGA/VGA: 0xA0000-0xAFFFF
0x00000 – 0x9FFFF	640 k	DOS memory space

4.4.2 I/O Addresses

The following table presents the I/O memory mapping:

Table 4-4: I/O Address Map

I/O Address	Read Target	Write Target	Internal Unit
00h–08h	DMA Controller	DMA Controller	DMA
09h–0Eh	RESERVED	DMA Controller	DMA
0Fh	DMA Controller	DMA Controller	DMA
10h–18h	DMA Controller	DMA Controller	DMA
19h–1Eh	RESERVED	DMA Controller	DMA
1Fh	DMA Controller	DMA Controller	DMA
20h–21h	Interrupt Controller	Interrupt Controller	Interrupt
24h–25h	Interrupt Controller	Interrupt Controller	Interrupt
28h–29h	Interrupt Controller	Interrupt Controller	Interrupt
2Ch–2Dh	Interrupt Controller	Interrupt Controller	Interrupt
2E–2F	LPC SIO	LPC SIO	Forwarded to LPC
30h–31h	Interrupt Controller	Interrupt Controller	Interrupt
34h–35h	Interrupt Controller	Interrupt Controller	Interrupt
38h–39h	Interrupt Controller	Interrupt Controller	Interrupt
3Ch–3Dh	Interrupt Controller	Interrupt Controller	Interrupt
40h–42h	Timer/Counter	Timer/Counter	PIT (8254)
43h	RESERVED	Timer/Counter	PIT
4E–4F	LPC SIO	LPC SIO	Forwarded to LPC
50h–52h	Timer/Counter	Timer/Counter	PIT
53h	RESERVED	Timer/Counter	PIT
60h	Microcontroller	Microcontroller	Forwarded to LPC
61h	NMI Controller	NMI Controller	Processor I/F
62h	Microcontroller	Microcontroller	Forwarded to LPC
64h	Microcontroller	Microcontroller	Forwarded to LPC
66h	Microcontroller	Microcontroller	Forwarded to LPC
70h	RESERVED	NMI and RTC Controller	RTC
71h	RTC Controller	RTC Controller	RTC

I/O Address	Read Target	Write Target	Internal Unit
72h	RTC Controller	NMI and RTC Controller	RTC
73h	RTC Controller	RTC Controller	RTC
74h	RTC Controller	NMI and RTC Controller	RTC
75h	RTC Controller	RTC Controller	RTC
76h	RTC Controller	NMI and RTC Controller	RTC
77h	RTC Controller	RTC Controller	RTC
80h	DMA Controller, or LPC, or PCI	DMA Controller and LPC or PCI	DMA
81h–83h	DMA Controller	DMA Controller	DMA
84h–86h	DMA Controller	DMA Controller and LPC or PCI	DMA
87h	DMA Controller	DMA Controller	DMA
88h	DMA Controller	DMA Controller and LPC or PCI	DMA
89h–8Bh	DMA Controller	DMA Controller	DMA
8Ch–8Eh	DMA Controller	DMA Controller and LPC or PCI	DMA
08Fh	DMA Controller	DMA Controller	DMA
90h–91h	DMA Controller	DMA Controller	DMA
92h	Reset Generator	Reset Generator	Processor I/F
93h–9Fh	DMA Controller	DMA Controller	DMA
A0h–A1h	Interrupt Controller	Interrupt Controller	Interrupt
A4h–A5h	Interrupt Controller	Interrupt Controller	Interrupt
A8h–A9h	Interrupt Controller	Interrupt Controller	Interrupt
ACh–ADh	Interrupt Controller	Interrupt Controller	Interrupt
B0h–B1h	Interrupt Controller	Interrupt Controller	Interrupt
B2h–B3h	Power Management	Power Management	Power Management
B4h–B5h	Interrupt Controller	Interrupt Controller	Interrupt
B8h–B9h	Interrupt Controller	Interrupt Controller	Interrupt
BCh–BDh	Interrupt Controller	Interrupt Controller	Interrupt
C0h–D1h	DMA Controller	DMA Controller	DMA
D2h–DDh	RESERVED	DMA Controller	DMA
DEh–DFh	DMA Controller	DMA Controller	DMA
F0h	PCI and Master Abort1	FERR#/IGNNE# / Interrupt Controller	Processor I/F
170h–177h	IDE Controller, SATA Controller, or PCI	IDE Controller, SATA Controller, or PCI	Forwarded to IDE or SATA
1F0h–1F7h	IDE Controller, SATA Controller, or PCI 2	IDE Controller, SATA Controller, or PCI	Forwarded to IDE or SATA
376h	IDE Controller, SATA Controller, or PCI	IDE Controller, SATA Controller, or PCI	Forwarded to IDE or SATA
3F6h	IDE Controller, SATA Controller, or PCI 2	IDE Controller, SATA Controller, or PCI	Forwarded IDE or SATA
4D0h–4D1h	Interrupt Controller	Interrupt Controller	Interrupt
CF9h	Reset Generator	Reset Generator	Processor I/F

Notes:
1. A read to this address will subtractively go to PCI, where it will master abort.
2. Only if IDE I/O space is enabled (D31:F1:40 bit 15) and the IDE controller is in legacy mode. Otherwise, the target is PCI.

Chapter 5

Phoenix® BIOS Setup

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5 Phoenix® BIOS Setup

The Phoenix® BIOS in your SBC is an adapted version of a standard BIOS for IBM PC AT-compatible personal computers equipped with Intel®x86 and compatible processors. The BIOS provides low-level support for the central processing, memory, and I/O system units.

With the help of BIOS Setup program, you can modify the BIOS configuration parameters and control the special features of your module. The Setup program is started by pressing the F2 key and offers a convenient menu interface to modify basic system configuration settings and switching between the subsystems operation modes. These settings are stored in a dedicated battery-backed memory, CMOS RAM, which keeps the information when the power is switched off.

5.1 Boot Details

5.1.1 Booting without a Monitor, Keyboard or Mouse

To boot without a monitor, keyboard or mouse set the item "POST Errors" to "Disabled" at the page "Main" in PhoenixBIOS Setup program. This setting is a default one.

5.1.2 Booting from USB

To boot from a device connected to USB:

- Connect the device to boot from to a USB port. The appropriate USB controller should be enabled;
- Enter the PhoenixBIOS Setup program;
- Find this USB device in Boot Priority list at the "Boot" page and use «+» or «–» buttons to move it up or down in order to change its boot priority.
  In case the device is not in the Boot Priority list, find it in Excluded from Boot Order list, press “x” to move it to the Boot Priority list and set the boot order with «+» or «–» buttons;
- Save changes and reboot the module.

To get the on-line help about the details of BIOS Setup program operation, please apply to the screen tips and the integrated help system.

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Chapter 6

Thermal and Power Issues

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6 Thermal and Power Issues

6.1 Temperature Control

Intensive operation of Intel Pentium M processor in harsh environment requires a special technology to keep the processor's die temperature within allowed limits. The following sections provide system integrators with the information, which will help to meet thermal requirements when developing systems based on CPC1100.

6.1.1 Passive Regulation

The thermal management concept of CPC1100 module includes four separate but correlated functions. Their main purpose is to protect the processor from overheating and reduce its power consumption. Dedicated thermal control subsystem allows the processor to operate within safe temperature range without the need for special software or interrupt handling.

The four thermal protection functions provided by the processor are:

1. **Thermal Throttling**: The Pentium M internal thermal monitor controls the temperature of the processor. The internal temperature sensor is located near the hottest area of the processor die. Each processor is individually adjusted at the factory to compensate the potential manufacturing variations of its characteristics. To reduce the processor power dissipation the internal thermal monitor switches the processor core clock on and off with a duty cycle factor of 50%.
2. The Intel® Pentium® M processor supports the Intel **SpeedStep**® enhanced technology. It allows to switch the processor core voltage and frequency between several modes from High Frequency Mode to Low Frequency Mode without resetting the system. For example, the processor operating at 1.6 GHz and 1.484 V (HFM) can be switched down to 600 MHz and 0.956 V (LFM), thus reducing the processor power consumption in approx. 4 times.
3. **Thermtrip** function is always on to protect the processor in any event. In case of a serious cooling subsystem failure, the processor will automatically shut down when the die temperature has reached approximately 125°C. Once Thermtrip is activated, the system does not return to the normal operation mode automatically, it is necessary to reset the BIOS settings and to cold restart the system. The BIOS settings can be reset by lifting the contact plate of the battery holder for a period of more than 5 seconds.
4. **External thermal monitor** (LM87) gathers information about the processor and board surface temperatures from two sensors. This information may then be requested by a program to undertake the appropriate actions.

Recommendations

Generally, there is no need to enable the Thermal Management functions if the module is operated in an optimally designed environment with sufficient air flow. However, to guarantee a stable system in unsteady environment, both the internal and the external thermal monitors should be enabled. These two monitors protect the processor and the whole system against overheating.

Note:

Thermal Management functions should be disabled when performing Benchmarks and performance tests, otherwise the results will be incorrect due to the power reduction processes influence.

6.1.2 Active Regulation

To provide controlled active heat dissipation CPC1100 is equipped with standard heatsinks. Together with a system chassis with adjustable forced airflow capability, this provides a basis for reliable and steady operation. Forced airflow of sufficient volume is vital for high performance processors operating in high temperature environments.

When developing applications using the CPC1100, the system integrator must take into account the overall system thermal requirements. System chassis must satisfy these requirements. When performing thermal calculations for certain application, the developer must consider the contribution of peripherals to be used with the CPC1100 to the total heat emission. These devices must also be capable to operate at the temperatures within the system operating range, especially those, which are attached directly to the CPC1100 processor module.

Warning!!!

Since Fastwel does not assume responsibility for any damage to the CPC1100 module or other system parts resulting from overheating of the central processor, it is important to ensure that the CPC1100 operational environment parameters conform to the thermal requirements described in this Manual.

6.2 System Power

The Intel Pentium M processor family requires special characteristics of the power supply unit and the baseboard.

The CPC1100 module itself has been designed to provide best possible power supply for each system unit. However, in order to guarantee reliable and faultless operation the following requirements must be taken into account. Absolute maximum input voltages presented in the table below must not be exceeded to guarantee that the CPC1100 is not damaged. The ranges for the different input power voltages, within which the module is functional, are also presented.

Table 6-1: DC Input Voltage Ranges and Limits

Power Voltage, V	Maximum Permitted Value, V	Absolute Limits, V	Recommended Range, V
+3.3	+3.6	3.2 to 3.47	3.3 to 3.47
+5	+5.5	4.9 to 5.25	5.0 to 5.25
+12	+14.0	11.4 to 12.6	–
-12	-14.0	-11.4 to -12.6	–

Power supplies to be used with the CPC1100 should comply with these requirements.

Input power connections to the baseboard itself should provide minimum power loss. Avoid using long input lines, low carrying capacity cables, and high resistance connections.

To select the appropriate system power supply, it is necessary to consider the CPC1100 own power consumption (about 35 watts), the consumption of the remaining system components, possible variations of power consumption during operation (e.g. due to temperature changes) and some reserve. Taking all this into account, it is recommended to use a 150 watt power supply. If possible, power supplies with voltage sensing should be used. This may require an appropriate baseboard.

Table 6-2: Some CPC1100 Components Power Consumption

System Modules		Power Consumption
Pentium M 1.6 CPU		24.5 W
915GM+ICH6M Chipset		6 + 2.3 W
DDR SDRAM SODIMM PC2700 1 GB	(2.5 V)	5 W
Gigabit Ethernet chips 2pcs		1548x2 mW
CompactFlash card	(3.3 V)	100 to 300 mW
Keyboard	(5 V)	100 mW

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Appendices

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Appendix A

A Supplementary Information

A.1 Related Standards and Specifications

The Fastwel's PICMG modules comply with the requirements of the following standards:

Table A-1: Related Standards

Type	Standard	Test Parameters
CE: Emission	EN50081-1	–
CE: Immission	EN61000-6-2	–
CE: Electrical safety	EN60950	–
Mechanical dimensions	IEEE 1101.10	–
Vibration (sinusoidal)	IEC60068-2-6-82; Fc	5 g / 10-500 Hz / 10 (acceleration / frequency range / test cycles per axis)
Permanent shock	IEC60068-2-29-87; Eb	50 g / 11 ms / 1000±10 / 1 s (peak acceleration / shock duration half sine / number of shocks / recovery time)
Single shock	IEC60068-2-27-87; Ea	100 g / 9 ms / 18 / 3 s (peak acceleration / shock duration / number of shocks / recovery time in seconds)
Reduced atmospheric pressure	IEC 60068-2-13-83, M	9 kPa (1.305 psi); approx. corresponds to 17000 m (over 55700 ft) above sea level

Important...

Some versions of the module may have the test results differing from the ones presented in the above table. For more information, please contact Fastwel's official representatives.

Information related to this product and its components can be found in the following specifications:

Table A-2: Related Specifications

Product	Specification
PICMG	PICMG 1.0, Rev. 2.0
PCI Bus	PCI 2.3 Compliant Specifications For latest revision of the PCI specifications, contact the PCI Special Interest Group Office at: http://www.pcisig.com
PCI Express	PCI Express 1.0a Specification
MiniPCI	MiniPCI Specification, Rev. 1.0
CompactFlash Cards	CF+ and CompactFlash Specification, Revision 4.1

The Internet site of the PCI Industrial Computer Manufacturers Group (PICMG) provides information related to these standards (http://www.picmg.org/).

Appendix B

B Useful Abbreviations, Acronyms and Short-cuts

Abbreviation	Meaning
BMC	Baseboard Management Controller
PM	Peripheral Management Controller
IPMI	Intelligent Platform Management Interface
IPMB	Intelligent Platform Management Bus
I^2C™	Inter Integrated Circuit Two-thread serial protocol, used in SMB and IPMI
KCS interface	Keyboard Controller Style interface Interface for communication between control software and BMC, similar to a keyboard controller interface
BT interface	Block Transfer interface Block transfer interface for communication between control software and BMC
DDR SDRAM	Double Data Rate Synchronous Dynamic Random Access Memory
SODIMM	Small Outline Dual In-Line Memory Module
ECC	Error Correction Code Data error correction technology used in memory modules
FWH	Firmware Hub Nonvolatile memory chip, part of Intel chipset, used for main and reserve BIOS copies in CPC1100
GMCH	Graphics and Memory Controller Hub
USB	Universal Serial Bus
LPC	Low Pin Count External devices communication interface
SMB	System Management Bus
UART	Universal Asynchronous Receiver-Transmitter
UHCI	Universal Host Controller Interface USB Host Controller Interface
EHCI	Enhanced Host Controller Interface (Universal Serial Bus specification)
UTP	Unshielded Twisted Pair
CRT-display	Cathode Ray Tube Display
PMC	PCI (Peripheral Component Interconnect) Mezzanine Card
CMC	Common Mezzanine Card
LVDS	Low Voltage Differential Signal Digital monitors communication specification
RTC	Real Time Clock
BIOS	Basic Input-Output System
PC	Personal Computer
PICMG	PCI Industrial Computer Manufacturers Group
AHA	Accelerated Hub Architecture GMCH and ICH communication bus specification

Abbreviation	Meaning
AGP	Accelerated Graphics Port
AGTL	Advanced Gunning Transceiver Logic PSB (Processor Side Bus) signal exchange specification
SMBus	System Management Bus
EEPROM	Electrically Erasable Programmable Read-Only Memory
NAND Flash	Not And (electronic logic gate) Flash memory specification
SSD	Solid State Disk
PLCC	Plastic Leaded Chip Carrier
RAMDAC	Random Access Memory Digital-to-Analog Converter
DAC	Digital-to-Analog Converter
DVMT	Dynamic Video Memory Technology
TTL	Transistor-Transistor Logic
ECP/EPP	Extended Capabilities Port / Enhanced Parallel Port Parallel port specifications
FDD	Floppy Disk Drive
EIDE	Enhanced Integrated Drive Electronics Mass storage devices interface
DMA	Direct Memory Access
PIO	Programmed Input/Output EIDE: Directly processor controlled data exchange
Rear I/O Board	Rear Input-Output Board Auxiliary interface board, which is connected to the cPCI backplane rear connectors
PWM output	Pulse-Width Modulation Cooling fan control technique
ESD	Electrostatically Sensitive Device Electrostatic Discharge
ACPI	Advanced Configuration and Power Interface
POST	Power On Self Test
cPCI	CompactPCI Industrial automation systems standard
EOS	Electrical Overstress
MDI	Media Dependent Interface Interface with connection type automatical detection